

REMARKS

This is in response to the Office Action dated December 12, 2008. Applicant has amended the application as set forth above. In specific, Claims 2 and 4 have been canceled without prejudice, and Claims 1, 13, and 14 have been amended. All the features of the amended claims are fully supported by the originally filed application. Thus, the amendments do not add new matter to the application. Upon the entry of the amendments, Claims 1, 3, and 5-14 are pending in this application. Applicant respectfully requests the entry of the amendments and reconsideration of the application.

Discussion of Objection to Abstract

The Examiner objected the abstract of the disclosure because it is more than 150 words. In response, Applicant has amended the Abstract of the Specification to be shorter than 150 words.

Discussion of Claim Rejection under 35 U.S.C. §112

The Examiner rejected claim 1-14 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In response, Applicant has amended Claims 1, 13, and 14 to be definite so as to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully requests withdrawal of the rejections.

Claims Rejected by Halpin (US 6143079) under 35 U.S.C. §102

The Examiner rejected claims 1, 3-6, 8, 11, and 13 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6143079 to Halpin. Applicant respectfully disagrees with the Examiner. However, Applicant has amended Claim 1 to clarify the inventive points of the independent claim.

Claim 1 of Instant Application (Emphasis added)

A rapid thermal processing system, comprising:
a chamber provided at a lateral wall of the chamber with one or more processing gas injection ports and at the opposite lateral wall thereof with one or more processing gas exhaust ports;

a heat source installed in the chamber for heating a wafer;

a quartz window mounted on the chamber such that the quartz window can be located below the heat source, wherein the outer peripheral surface of the quartz window consists of a combination of a tilt surface, a perpendicular surface, and a round surface;

an edge ring-support installed in the chamber such that edge ring-support can be located below the quartz window; and

an edge ring equipped on the edge ring-support for mounting the wafer,

wherein the chamber has an inner surface with a cross-section in a multi-line shape consisting of a plurality of arcs separated from each other and having the same radii and relative centers and a plurality of straight lines connecting the arcs to each other, wherein each of the arcs has a central angle of 15-50°.

Halpin Does Not Anticipate Claims of Intent Application

The present invention is directed to a rapid thermal processing system, which comprises an inner surface of a chamber defined by arcs and straight lines and quartz window having a combination of a tilt surface, a perpendicular surface, and a round surface. (See Figs. 3, 6, and 7).

The Examiner stated “*Halpin teaches the chamber has an inner surface with a top-down cross-section in a multi-line shape consisting of a plurality of arcs separated from each other and having the same radius and the same center and a plurality of straight lines connecting the arcs to each other. Halpin further teaches the chamber has a side cross-section of the inner surface in a multi-line shape consisting of a plurality of arcs separated from each other and having the same relative radius and the same relative center and a plurality of straight lines connecting the arcs to each other.*”

Applicant respectfully disagrees with the Examiner especially in the underline portion in the above. Halpin discloses a compact process chamber for improved process uniformity, which has a processing chamber defined by several straight lines and a window that is thin in a center portion and thicker in a surrounding peripheral portion, and in which deposition uniformity is improved by employing multiple outlet ports for distributing gas laterally in a short length, enabling a compact, symmetrical geometry. (See Abstract; Figs. 1-3)

As clearly seen in the figures, the straight lines in Halpin's disclosure do NOT connect the arcs, but extend to outer surfaces of the device to form one inlet 94 and three outlets 24, 26, 28. (See Fig. 3). Halpin's structure (1 inlet and 3 outlets) is a naturally derived result of the goal: deposition uniformity by employing multiple outlet ports for distributing gas laterally in a short length, enabling a compact, symmetrical geometry. (See Abstract).

Therefore, the apparatus as taught by Halpin is NOT structurally capable of performing the intended use and therefore does NOT anticipate a rapid thermal processing according to the present invention.

Claim 4 of Instant Application

Since Claim 4 has been canceled without prejudice, the rejection is now moot, but still Applicant respectfully submits that the limitation of the original Claim 4 is NOT anticipated by Halpin.

The Examiner stated *"Halpin teaches an outer peripheral surface of the quartz window consists of a combination of a perpendicular surface (Figure 2), a round surface (52 Figure 2) and a parallel surface which inclines away from the round surface (46 Figure 2)."*

Applicant respectfully disagrees with the Examiner. It is the outer peripheral "edge" surface of the quartz window in the present invention that consists of a combination of a tilt surface, a perpendicular, and a round surface (See Fig. 7). That is, all the tilt surface, perpendicular, and round surface are located at the outer edge surface of the quartz window. To the contrary, the portions 52, 46 of Halpin's apparatus are NOT on the edge of the quartz window, but on a top, even central, portion.

Therefore, the apparatus as taught by Halpin does NOT anticipate a structure of quartz window of a rapid thermal processing according to the present invention.

Claims Rejected by Grant (US 6391804) under 35 U.S.C. §102

The Examiner rejected Claims 1 and 2 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6391804 to Grant et al. Applicant respectfully disagrees with the Examiner. However, Applicant has amended Claim 1 to clarify the inventive points of the independent claim.

As discussed above, the present invention is directed to a rapid thermal processing system, which comprises an inner surface of a chamber defined by arcs and straight lines and quartz window having a combination of a tilt surface, a perpendicular surface, and a round surface. (See Figs. 3, 6, and 7). Also, each of the arcs of the inner surface of the chamber has a central angle of 15-50°.

The Examiner stated that “Grant discloses a chamber having an hexagonal inner surface that is free of corners, such that a cross-section of the chamber shows a multi-line shape consisting of a plurality of arcs separated from each other and having the same radius and the same center and a plurality of straight lines connecting the arcs to each other... The chamber there has six lines and six arcs distributed around 360°, such that the twelve lines/arcs could be divided equally around the chamber and the arcs would have a central angle of 30°.”

Applicant respectfully submits that the limitation of a central angle of 15-50° in the present invention is about each of the arcs, NOT straight lines portions. To the contrary, the central angle of 30° in Grant's is about the straight lines (See Fig. 2).

Therefore, the apparatus as taught by Grant does NOT anticipate a structure of quartz window of a rapid thermal processing in the amended Claim 1 of the present invention.

Claims Rejected by Halpin in view of Grant under 35 U.S.C. §103

The Examiner rejected Claim 2 under 35 U.S.C. §103(a) as being unpatentable over Halpin in further view of Grant. Applicant respectfully disagrees with the Examiner.

As discussed in the above in regarding to 102 rejections, Applicant respectfully submits that the original Claim 2 is not obvious over the cited references. Also, Claim 2 has been canceled without prejudice. Therefore, the rejection is now moot. Applicant respectfully requests withdrawal of the rejection.

Claims Rejected by Grant in view of Devine under 35 U.S.C. §103

The Examiner rejected Claims 3 and 4 under 35 U.S.C. §103(a) as being unpatentable over Grant in view of U.S. Patent Application No. 2005/0268567 to Devine et al.

Applicant respectfully disagrees with the Examiner. Since the amended Claim 1 is not anticipated by or obvious over Grant as shown in the above in regarding to the above 102 and 103 rejections, and the deficiency of Grant is not cured by Devine, Applicant respectfully submits that Claims 3 and 4 are patentable over the cited references. Also, Claim 4 has been canceled without prejudice. Therefore, the rejection is now moot.

Claims Rejected by Halpin in view of Devine under 35 U.S.C. §103

The Examiner rejected Claims 3 and 4 under 35 U.S.C. §103(a) as being unpatentable over Halpin in view of Devine et al. Applicant respectfully disagrees with the Examiner.

Since the amended Claim 1 is not anticipated by or obvious over Halpin as shown in the above in regarding to the above 102 and 103 rejections, and the deficiency of Halpin is not cured by Devine, Applicant respectfully submits that Claims 3 and 4 are patentable over the cited references. Also, Claim 4 has been canceled without prejudice. Therefore, the rejection is now moot.

Claims Rejected by Halpin and/or Grant in view of others under 35 U.S.C. §103

The Examiner rejected Claims 7 and 8 under 35 U.S.C. §103(a) as being unpatentable over Halpin in view of U.S. Patent No. 6501191 to Tanaka and over Grant in view of Tanaka; Claims 9, 10, and 14 over Grant in view of U.S. Patent No. 6133152 to Bierman et al. and over Halpin in view of Bierman et al.; and Claim 12 over Grant in view of U.S. Patent Application No. 2006/0057799 to Horiguchi et al. and over Halpin in view of Horiguchi.

Applicant respectfully disagrees with the Examiner. Since the amended Claim 1 is not anticipated by or obvious over Halpin, Grant, or their combination as shown in the above in regarding to the above 102 and 103 rejections, and the deficiency of Halpin, Grant, or their combination is not cured by the other cited references, Applicant respectfully submits that Claims 7-10, 12, and 14 are patentable over the cited references.

Applicant respectfully requests withdrawal of the rejection.

Conclusion

In view of the amendments and remarks made above, it is respectfully submitted that claims 1, 3, 5-14 are in condition for allowance, and such action is respectfully solicited, if required, under *Examiner's Amendment*. If it is believed that a telephone conversation would expedite the prosecution of the present application, or clarify matters with regard to its allowance, the Examiner is invited to contact the undersigned attorney at the number listed below.

Respectfully submitted,

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